

Claims

- 1) Nucleic acid encoding a 75 kD *Lawsonia intracellularis* protein or a part of said nucleic acid that encodes an immunogenic fragment of said protein, said nucleic acid or said part thereof having at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96% homology with a nucleic acid having a sequence as depicted in SEQ ID NO: 1
- 2) Nucleic acid encoding a 27 kD *Lawsonia intracellularis* protein or a part of said nucleic acid that encodes an immunogenic fragment of said protein, said nucleic acid or said part thereof having at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96% homology with a nucleic acid having a sequence as depicted in SEQ ID NO: 3
- 3) Nucleic acid encoding a 62 kD *Lawsonia intracellularis* protein or a part of said nucleic acid that encodes an immunogenic fragment of said protein, said nucleic acid or said part thereof having at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96% homology with a nucleic acid having a sequence as depicted in SEQ ID NO: 5
- 4) Nucleic acid encoding a 57 kD *Lawsonia intracellularis* protein or a part of said nucleic acid that encodes an immunogenic fragment of said protein, said nucleic acid or said part thereof having at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96% homology with a nucleic acid having a sequence as depicted in SEQ ID NO: 7
- 5) Nucleic acid encoding a 74 kD *Lawsonia intracellularis* protein or a part of said nucleic acid that encodes an immunogenic fragment of said protein, said nucleic acid or said part thereof having at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96% homology with a nucleic acid having a sequence as depicted in SEQ ID NO: 9
- 6) Nucleic acid encoding a 44 kD *Lawsonia intracellularis* protein or a part of said nucleic acid that encodes an immunogenic fragment of said protein, said nucleic acid or said part thereof having at least 90 %, preferably 92 %, more preferably 94 %

%, even more preferably 96% homology with a nucleic acid having a sequence as depicted in SEQ ID NO: 11

7) Nucleic acid encoding a 43 kD *Lawsonia intracellularis* protein or a part of said nucleic acid that encodes an immunogenic fragment of said protein, said nucleic acid or said part thereof having at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96% homology with a nucleic acid having a sequence as depicted in SEQ ID NO: 13

5 8) Nucleic acid encoding a 26/31 kD *Lawsonia intracellularis* protein or a part of said nucleic acid that encodes an immunogenic fragment of said protein, said nucleic acid or said part thereof having at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96% homology with a nucleic acid having a sequence as depicted in SEQ ID NO: 15

10 9) Nucleic acid encoding a 101 kD *Lawsonia intracellularis* protein or a part of said nucleic acid that encodes an immunogenic fragment of said protein, said nucleic acid or said part thereof having at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96% homology with a nucleic acid having a sequence as depicted in SEQ ID NO: 17

15 10) DNA fragment comprising a nucleic acid according to claims 1-9.

11) Recombinant DNA molecule comprising a nucleic acid according to claims 1-9 or a DNA fragment according to claim 10, under the control of a functionally linked promoter.

20 12) Live recombinant carrier comprising a nucleic acid according to claims 1-9, a DNA fragment according to claim 10 or a recombinant DNA molecule according to claim 11.

25 13) Host cell comprising a nucleic acid according to claims 1-9, a DNA fragment according to claim 10, a recombinant DNA molecule according to claim 11 or a live recombinant carrier according to claim 12.

14) A 75 kD *Lawsonia intracellularis* protein, said protein comprising an amino acid sequence that is at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96 % homologous to the amino acid sequence as depicted in SEQ ID NO: 2, or an immunogenic fragment of said protein.

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- 15) A 27 kD *Lawsonia intracellularis* protein, said protein comprising an amino acid sequence that is at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96 % homologous to the amino acid sequence as depicted in SEQ ID NO: 4, or an immunogenic fragment of said protein.
- 5 16) A 62 kD *Lawsonia intracellularis* protein, said protein comprising an amino acid sequence that is at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96 % homologous to the amino acid sequence as depicted in SEQ ID NO: 6, or an immunogenic fragment of said protein.
- 10 17) A 57 kD *Lawsonia intracellularis* protein, said protein comprising an amino acid sequence that is at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96 % homologous to the amino acid sequence as depicted in SEQ ID NO: 8, or an immunogenic fragment of said protein.
- 15 18) A 74 kD *Lawsonia intracellularis* protein, said protein comprising an amino acid sequence that is at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96 % homologous to the amino acid sequence as depicted in SEQ ID NO: 10, or an immunogenic fragment of said protein.
- 20 19) A 44 kD *Lawsonia intracellularis* protein, said protein comprising an amino acid sequence that is at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96 % homologous to the amino acid sequence as depicted in SEQ ID NO: 12, or an immunogenic fragment of said protein.
- 20 20) A 43 kD *Lawsonia intracellularis* protein, said protein comprising an amino acid sequence that is at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96 % homologous to the amino acid sequence as depicted in SEQ ID NO: 14, or an immunogenic fragment of said protein.
- 25 21) A 26/31 kD *Lawsonia intracellularis* protein, said protein comprising an amino acid sequence that is at least 90 %, preferably 92 %, more preferably 94 %, even more preferably 96 % homologous to the amino acid sequence as depicted in SEQ ID NO: 16, or an immunogenic fragment of said protein.
- 22) A 101 kD *Lawsonia intracellularis* protein, said protein comprising an amino acid sequence that is at least 90 %, preferably 92 %, more preferably 94 %, even more
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preferably 96 % homologous to the amino acid sequence as depicted in SEQ ID NO: 18, or an immunogenic fragment of said protein.

- 23) *Lawsonia intracellularis* protein according to claim 14-22 for use in a vaccine.
- 24) Use of a *Lawsonia intracellularis* protein according to claim 14-22 for the manufacturing of a vaccine for combating *Lawsonia intracellularis* infections.
- 5 25) Vaccine for combating *Lawsonia intracellularis* infections, characterised in that it comprises a nucleic acid according to claims 1-9, a DNA fragment according to claim 10, a recombinant DNA molecule according to claim 11, a live recombinant carrier according to claim 12, a host cell according to claim 13 or a protein according to claims 14-22, and a pharmaceutically acceptable carrier.
- 10 26) Vaccine according to claim 25, characterised in that it comprises an adjuvant.
- 27) Vaccine according to claim 25 or 26, characterised in that it comprises an additional antigen derived from a virus or micro-organism pathogenic to pigs or genetic information encoding said antigen.
- 15 28) Vaccine according to claim 27, characterised in that said virus or micro-organism pathogenic to pigs is selected from the group of Pseudorabies virus, Porcine influenza virus, Porcine parvo virus, Transmissible gastro-enteritis virus, Rotavirus, *Escherichia coli*, *Erysipelothrix rhusiopathiae*, *Bordetella bronchiseptica*, *Salmonella cholerasuis*, *Haemophilus parasuis*, *Pasteurella multocida*, *Streptococcus suis*, *Mycoplasma hyopneumoniae*, *Brachyspira hyodysenteriae* and *Actinobacillus pleuropneumoniae*.
- 20 29) Vaccine for combating *Lawsonia intracellularis* infections, characterised in that it comprises antibodies against a protein according to claims 14-22.
- 30) Method for the preparation of a vaccine according to claims 25-29, said method comprising the admixing of a nucleic acid according to claim 1-9, a DNA fragment according to claim 10, a recombinant DNA molecule according to claim 11, a live recombinant carrier according to claim 12, a host cell according to claim 13, a protein according to claim 14-22, or antibodies against a protein according to claim 14-22, and a pharmaceutically acceptable carrier.

- 31) Diagnostic test for the detection of antibodies against *Lawsonia intracellularis*, characterised in that said test comprises a protein or a fragment thereof as defined in claim 14-22.
- 32) Diagnostic test for the detection of antigenic material of *Lawsonia intracellularis*,
5 characterised in that said test comprises antibodies against a protein or a fragment thereof as defined in claim 14-22.